STATE OF SOUTH CAROLINA

BEFORE THE PUBLIC SERVICE COMMISSION OF SOUTH CAROLINA

COVER SHEET

Application of

Duke Energy Carolinas, LLC for Approval of Energy Efficiency Plan Including an Energy Efficiency Rider and Portfolio of Energy Efficiency Programs.

DOCKET NUMBER: 2007-358-E

(Please type or print)

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DOCKETING INFORMATION (Check all that apply)

☐ Emergency Relief demanded in petition ☐ Request for item to be placed on Commission's Agenda expeditiously

☒ Other:

INDUSTRY (Check one)	NATURE OF ACTION (Check all that apply)		
☒ Electric	☐ Affidavit	☐ Letter	☐ Request
☐ Electric/Gas	☐ Agreement	☐ Memorandum	☐ Request for Certificatio
☐ Electric/Telecommunications	☐ Answer	☒ Motion	☐ Request for Investigatior
☐ Electric/Water	☐ Appellate Review	☐ Objection	☐ Resale Agreement
☐ Electric/Water/Telecom.	☐ Application	☐ Petition	☐ Resale Amendment
☐ Electric/Water/Sewer	☐ Brief	☐ Petition for Reconsideration	☐ Reservation Letter
☐ Gas	☐ Certificate	☐ Petition for Rulemaking	☐ Response
☐ Railroad	☐ Comments	☐ Petition for Rule to Show Cause	☐ Response to Discovery
☐ Sewer	☐ Complaint	☐ Petition to Intervene	☐ Return to Petition
☐ Telecommunications	☐ Consent Order	☐ Petition to Intervene Out of Time	☐ Stipulation
☐ Transportation	☐ Discovery	☐ Prefiled Testimony	☐ Subpoena
☐ Water	☐ Exhibit	☐ Promotion	☐ Tariff
☐ Water/Sewer	☐ Expedited Consideration	☐ Proposed Order	☒ Other: Testimony of Judah Rose
☐ Administrative Matter	☐ Interconnection Agreement	☐ Protest	
☐ Other:	☐ Interconnection Amendment	☐ Publisher's Affidavit	
	☐ Late-Filed Exhibit	☐ Report	

BEFORE

THE PUBLIC SERVICE COMMISSION OF

SOUTH CAROLINA

DOCKET NO. 2007- 358 – E

In re:	)	
Application of Duke Energy Carolinas, LLC	)	**TESTIMONY OF**
For Approval of Energy Efficiency Plan	)	**JUDAH ROSE FOR**
Including an Energy Efficiency Rider and	)	**DUKE ENERGY CAROLINAS**
Portfolio of Energy Efficiency Programs	)	
	)	

I. INTRODUCTION AND PURPOSE

Q. PLEASE STATE YOUR NAME, POSITION, AND BUSINESS ADDRESS.

A. My name is Judah Rose. I am a Managing Director of ICF International ("ICF"), a global professional services firm that partners with government and commercial clients to deliver consulting services and technology solutions in energy, climate change, environment, transportation, social programs, health, defense, and emergency management. My business address is 9300 Lee Highway, Fairfax, Va. 22031.

Q. PLEASE SUMMARIZE YOUR EDUCATIONAL BACKGROUND AND PROFESSIONAL QUALIFICATIONS.

A. After receiving a degree in economics from the Massachusetts Institute of Technology and a Masters Degree in Public Policy from the John F. Kennedy School of Government at Harvard University, I joined ICF in 1982. Thus, I have worked at ICF for over 25 years. I have also been a member of the Board of Directors of ICF International and am one of three people in a firm of over 2,500 people to have been given the honorary title Distinguished Consultant. For additional details, please see my resume, which is attached as Rose Exhibit No. 1.

Q. DO YOU HAVE PUBLIC SECTOR CLIENTS?

A. Yes. ICF has been the principal power consultant to the U.S. Environmental Protection Agency ("EPA") continuously for over 25 years. ICF has conducted studies for regional transmission organizations ("RTOs") and the Federal Energy Regulatory Commission's ("FERC") study of electric transmission policy. We have worked with the US Department of Energy, Environment Canada, and numerous foreign governments. We have also worked with state regulators and state energy agencies, including those in Kentucky, New Jersey, California, Texas, New York, Ohio, Connecticut, and Michigan. This work includes extensive energy efficiency and demand side management related activities ranging from planning to implementation to evaluation.

Q. DO YOU HAVE PRIVATE SECTOR CLIENTS?

A. Yes. ICF provides assistance to electric utilities including Duke Energy Corporation ("Duke Energy") and its various operating companies, including Duke Energy Carolinas, LLC ("Duke Energy Carolinas" or the "Company"), in addition to others such as Dominion Power, American Electric Power, Entergy, Delmarva Power & Light, FirstEnergy, and Florida Power & Light, financial institutions including Credit Suisse, power marketers including Mirant, fuel companies including Peabody Coal Company, and independent power producers including Sithe Global Power, Kelson Energy and Reliant Energy. This work covers demand and supply-side issues.

Q. WHAT TYPE OF WORK DO YOU TYPICALLY PERFORM?

A. I have extensive experience in power system economics, Integrated Resource Planning, and assessing avoided costs and wholesale power prices. Integrated Resource Planning involves both demand and supply-side resources and many of the issues addressed in my testimony.

Q. DO YOU HAVE OTHER RELEVANT EXPERIENCE?

A. Yes, I have testified in many legal proceedings, including many utility planning proceedings. In addition, I have authored numerous articles in industry journals and spoken at scores of conferences regarding electric power issues.

Q. HAVE YOU TESTIFIED BEFORE, OR MADE PRESENTATIONS TO REGULATORS AND LEGISLATORS?

A. Yes. I have testified before or made presentations to the FERC and state regulators and legislators in South Carolina, North Carolina, Arizona, Arkansas, California, Florida, Indiana, Kentucky, Louisiana, Minnesota, New Jersey, New York, Ohio, Oklahoma, and Pennsylvania.

Q. ON WHOSE BEHALF ARE YOU TESTIFYING IN THIS PROCEEDING?

A. I am testifying on behalf of Duke Energy Carolinas.

Q. WHAT IS THE PURPOSE OF YOUR TESTIMONY?

A. The purpose of my testimony is to provide economic and policy analysis related to energy efficiency[1] in general, and the Company's proposed "save-a-watt" regulatory model, in particular.

Q. HOW IS THE REMAINDER OF YOUR TESTIMONY ORGANIZED?

A. My testimony is divided into five sections. In Section I, I introduce my testimony. In Section II, I present a summary of my testimony. In Section III, I summarize the key economic issues affecting energy efficiency programs generally. In Section IV, I briefly summarize the key economic issues related

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[1] The term "energy efficiency," as used in this testimony, includes both energy efficiency/conservation and demand response measures.

specifically to the proposed save-a-watt regulatory model. In Section V, I present and discuss the status of energy efficiency programs in the U.S. generally and compare them to save-a-watt.

II. SUMMARY

Q. PLEASE SUMMARIZE YOUR TESTIMONY.

A. Duke Energy Carolinas' save-a-watt proposal is an innovative, comprehensive and streamlined approach that does not rely on traditional cost recovery but instead focuses on the value created by energy efficiency. The Company recognizes that a "business as usual" approach to energy efficiency will achieve "business as usual" results, so its incentive-based Energy Efficiency Plan seeks to maximize energy efficiency potential and results.

Even after more than two decades of Integrated Resource Planning ("IRP") and other attempts to increase customer-funded energy efficiency, there is evidence that U.S. electric utilities can further decrease the total costs of service by increasing the amount of customer-funded energy efficiency. This potential for more energy efficiency is especially high due to recent increases in supply-side costs, continuing electricity demand growth potentially requiring decisions about large supply-side investments, developments in appliances, automated controls, and other technology developments which facilitate efficiency improvements, and the increased concern about additional supply-side costs not currently being included in avoided costs calculations (such as costs due to CO_2 emission regulations).

The potential existence of significant amounts of cost saving energy efficiency opportunities also raises the question of why they have not already been achieved in any state. Even after accounting for the lag in response to recent improved economics of energy efficiency and the lead times for energy efficiency, the untapped potential appears significant. For example:

- Nationwide estimates indicate that energy efficiency only decreases electricity demand by 2.1%. This supports the view that there is untapped potential because some estimates indicate that 24% savings are achievable over an extended period *i.e.* the national average potential is 12 times the estimated level of sales reductions. This 2.1% savings achieved is also low compared to the annual average growth rate of U.S. electricity demand which is approximately 2.5% per year.
- Nationwide expenditures also support the view that there is untapped energy efficiency potential. Nationwide expenditures are on average only 0.5% of total electric revenues, and between 1993 and 2004 expenditures fell nationwide 4% per year in real terms.
- Everywhere there is a large gap between the estimated potential and achieved savings. Even in the six largest states in terms of energy efficiency expenditures, which account for approximately 64% of total U.S. customer funded energy efficiency expenditures, savings only average 5% of electricity demand. This record of 5% savings supports the view that more energy efficiency is available since even in the states spending the most energy efficiency still fall well short of 24% national

potential savings estimate. This data especially supports the view of untapped potential in light of the fact that the average electric rates in these states is very high, approximately 31% above the U.S. average and 65% above average South Carolina rates. Savings should be higher due to these high rates.

- California has the largest energy efficiency program in the country, but it too falls short of the estimated potential. California, while having the highest estimated energy efficiency demand savings at 8%, is still only at one-third the estimated national potential. This supports the view that in all states there is untapped potential energy efficiency savings because electric rates in California are 81% above South Carolina's such that the savings potential should be even higher than the nationwide estimate. After spending more that any other state on energy efficiency using traditional approaches, California is not satisfied with business as usual and is seeking innovation in energy efficiency. While different than save-a-watt, California has adopted formal incentive mechanisms for utilities pursuing energy efficiency.

Three explanations for the lack of more energy efficiency are highlighted here:

- First, there is significant uncertainty with respect to energy efficiency. There is uncertainty about free ridership[2], the effect of other efficiency programs (*e.g.*, future changes in standards), program costs, participation

[2] Free riders are those customers who receive an incentive but would have purchased the energy efficiency equipment even without the incentive.

rates, policies, etc. This uncertainty is highlighted by the fact that nowhere has any state come close to the estimated national 24% savings level and hence there is no verification that this savings potential can be achieved.

- Second, there may exist disincentives or lack of incentives for some utilities to invest in energy efficiency activities that do not contribute to earnings or earnings growth, and that decrease their sales.
- Third, energy efficiency can generally be expected to benefit customers by avoiding higher supply-side costs. However, energy efficiency might unintentionally increase average electric rates for and bills of non-participants as utility fixed costs are carried by fewer sales. Further, the greater the energy efficiency, the greater the chance that this might happen. Put another way, rates could increase for those customers that simply choose not to participate, but also for those that are already the most efficient – *e.g.,* non-participants that are already energy efficient. Commission guidance in evaluating efficiency and rate equity trade-offs is required for energy efficiency generally, and the Company's proposal in particular in light of its potential to significantly increase the level of energy efficiency, and hence, increase the potential for adverse rate impacts on non-participants.

The Company's save-a-watt proposal directly addresses these issues in an innovative, streamlined and comprehensive manner. First, on the revenue side, it creates a formula which strongly incentivizes the utility to pursue energy efficiency, by allowing the utility an opportunity to earn a return and grow revenues from successful energy efficiency activities in exchange for undertaking the risks entailed by save-a-watt. Under the Company's proposal, revenues to the utility would equal 90% of the avoided costs created by the energy efficiency activity. Since the highest revenue level that is still economic is 100% of avoided costs, 90% is the close to the maximum that can be paid, and reflects a discount intended to create a "win-win" result for customers and shareholders.

Second, in exchange, the utility is responsible for the costs and verifying to regulators the performance of the programs. This feature has the benefit of decreasing the uncertainties and risks to customers of underperforming energy efficiency activities. This also focuses utility attention on the value created.

Third, it provides regulators an opportunity to provide guidance on the amount of energy efficiency to pursue because programs will be described and approved in advance. Thus, any potential for unintended impacts on non-participants can be addressed up-front.

Other states are pursuing a range of approaches toward energy efficiency and in some cases are in the process of changing their approach. In most states with significant customer energy efficiency programs, there are now formal utility incentives for energy efficiency. In many cases, these programs are new, innovative and are premised on the potential for explicit incentives to increase the level of energy efficiency activity beyond historical levels. However, unlike the save-a-watt model, none of these other approaches have proposed totally divorcing incentives from costs or placed as much emphasis on having the utility absorb the risks of higher costs or less than expected energy efficiency savings.

While most states with significant energy efficiency program include utility incentives, alternative approaches to energy efficiency are more similar to the programs used heretofore and are less innovative. They rely more on traditional regulatory and administrative mechanisms – *i.e.,* "command and control" cost oriented rather than value-oriented regimes. The attraction of these programs is the potential to achieve energy efficiency with lower rate increases since there are little or no incentive payments to utilities. Put another way, there are less risks of high utility returns. However, they represent a continuation or partial continuation of practices that have thus far left a large gap between estimated energy efficiency potential and achieved savings. In contrast to a much more innovative value-oriented approach like save-a-watt, command and control places a large burden on the regulatory process to increase energy efficiency, especially if there is the possibility that the utilities lack sufficient incentives or have disincentives. This traditional approach requires regulators to be more involved in finding areas for innovation, overseeing utility activities, working to overcome utility indifference or reluctance, sustaining the regulatory apparatus, *etc.* This involvement is especially challenging in light of the multiplicity of electricity end uses, the diversity among users and the range of potential programs, the potential for rapidly changing conditions and the overall complexity of energy efficiency. It is also challenging in light of the long lead time for many energy efficiency programs which rely on changing the replacement chosen when existing long lived equipment and structures need replacement.

Another approach being followed in a few states is to collect customer funding, and have the programs implemented by third parties such as non-profit entities. The arguments advanced are that these entities lack any potential energy efficiency disincentives, and costs might be lower at non-profits. This approach is only occurring in a few states, and there is no clear evidence that it has significantly closed the gap between estimated potential and achievement. Arguments against this approach include the concern that the lack of positive customer value-oriented incentives will stifle innovation and action, and the fact that it fails to exploit potential utility implementation advantages including: existing relationships with their customers that create economies of scale, especially with smaller customers; knowledge of their service territory and avoided costs; knowledge of their resource needs and the timing of those needs; knowledge about electric usage; relationships with third party vendors; and existing mechanisms for coordination with regulators, lower cost of capital, *etc.*

A definitive conclusion about what is the best energy efficiency regulatory model is not possible. This is, in large part, due to the limited amounts of empirical evidence. The Company's Energy Efficiency Plan is new, innovative, comprehensive and streamlined, but as with any proposal, until it is tested on a sustained basis in today's high supply-side avoided cost environment, the effect on utility behavior cannot be determined. However, the save-a-watt approach is enticing, due to its creation of incentives for action and innovation, its value orientation, the attractiveness of breakthroughs in energy efficiency, and the fact that more-traditional approaches have often failed to fully exploit the estimated potential reach of energy efficiency.

Conclusions about the proper mix of regulation and incentives are also difficult because they depend on how each approach is implemented, *e.g.*, whether a particular jurisdiction can, in the absence of strong formal financial incentives, sustain the oversight needed to ensure maximum energy efficiency and to go beyond current practice which has not fully exploited the energy efficiency resource. It also depends on regulators' willingness to choose the benefits of potentially major near term reductions in electricity sales due to energy efficiency results in exchange for the risk that an innovative energy efficiency approach could increase utility earnings attendant with a value orientation, rather than a cost orientation.

The Company's Energy Efficiency Plan has the potential to greatly increase energy efficiency and the economic efficiency of power delivery. The save-a-watt model creates formal incentives which provide a nearly maximum incentive for the utility to pursue energy efficiency opportunities. The model provides incentive for the utility to innovate with respect to program design, the use of new technologies and cost controls and with respect to the deployment of the utility's economies of scale in pursuit of energy efficiency, which is especially helpful for smaller customers. The model properly focuses on delivery of value, *i.e.,* verified decreases in avoided costs in a manner insulating customers from cost overruns. It is a creative response to the evidence that business as usual does not maximize energy efficiency potential.

III. BACKGROUND ON ENERGY EFFICIENCY ECONOMICS

Q. CAN YOU PLEASE DISCUSS THE ECONOMIC EFFICIENCY OF CUSTOMER FUNDED ENERGY EFFICIENCY PROGRAMS GENERALLY?

A. Yes. Economic efficiency is an important criterion to apply to utility actions. Actions that are economically efficient minimize the costs of meeting total demand for electricity. There are several points with respect to the economic efficiency of applying customer funded energy efficiency programs generally. These points are relevant to save-a-watt, which shares many of these general economic considerations.

- First, in general, the avoided costs of supply-side options are currently higher than the costs of incremental energy efficiency programs. Hence, increasing the amount of energy efficiency is economic from the perspective of minimizing customer costs, and all else being equal, should be pursued as long as incremental energy efficiency costs are less than the avoided costs of meeting marginal or incremental demand.
- Second, higher utility avoided costs make energy efficiency more economic. Thus, rising fuel prices and increases in other supply costs make energy efficiency more economic and vice versa.
- Third, the economic advantages of energy efficiency programs increase to the extent energy efficiency programs include benefits that supply-side

options do not. For example, in my recent testimony in North Carolina in the Company's Cliffside CPCN proceeding (NCUC Docket No. E-7, Sub 790), most of the planning scenarios included costs for potential carbon dioxide (CO_2) emission regulations, but my understanding is that they are not reflected in the estimate of avoided or incremental system costs. This makes energy efficiency even more economically attractive than calculated because it does not result in CO_2 emissions. The desire to minimize societal cost including costs external to avoided cost calculations and associated payments to the utility, means that energy efficiency programs should be pursued in even greater amounts until the incremental societal benefits equal the incremental costs.

- Fourth, developing and implementing energy efficiency can have significant lead times. This factor places significant importance on forecasts of both supply and demand side resources, utility needs, and future avoided costs. It also places strong emphasis on developing a sustainable approach for energy efficiency including having important support from key participants.

Q. HOW DOES UNCERTAINTY AFFECT THE ECONOMIC EFFICIENCY OF ENERGY EFFICIENCY?

A. Energy efficiency savings can be uncertain, especially in the context of new innovative programs designed to expand the heretofore relatively limited role of energy efficiency into new pioneering territory. This is due to uncertainty over free ridership, participation rates, the ability to opt out of some programs with little or no penalty, program costs, the effect of non-customer efficiency programs which might diminish the potential for customer funded programs (*e.g.*, future changes in governmental efficiency standards), the trade off effects of significantly increased energy efficiency impacts for potential increases in the bills of non-participants, *etc.* Under some circumstances, energy efficiency can be viewed as more uncertain than supply-side options in terms of the ability to meet demand levels, in large part due to the fact that the utility doesn't control demand-side actions as it does supply-side actions. For example, one might consider purchasing "iron in the ground" to be a more certain means of meeting summer peak load than relying on energy efficiency programs for which it may be difficult in advance to predict free ridership, participation rates, costs needed to achieve expected participation rates, *etc.* If the energy efficiency demand reductions do not materialize as expected, avoided costs could be higher because the utility will need to respond to greater than expected demand growth with less lead time (*e.g.*, incremental power costs might be higher if one has less lead time to accommodate demand growth). Uncertainty can also cause program costs to be higher than expected on a per MW or MWh saved level.

Q. COULD ENERGY EFFICIENCY, IN FACT, PROVIDE GREATER CERTAINTY THAN SUPPLY OPTIONS?

A. Yes, depending on the energy efficiency program and the supply option. For example, the fuel costs of some supply-side resources could be more uncertain than the costs of energy efficiency reductions.

Q. WHAT IF THE DECISION MAKERS ARE RISK AVERSE?

A. It is not uncommon to be risk averse, and there is no single answer on how much risk averseness is appropriate. In light of the fact that uncertainties affect both energy efficiency and supply-side options, the response to risk in terms of supply versus demand side options is also not clear. However, incorporating the desire to avoid risk, creates interest in the utility structuring programs to absorb this risk as opposed to customers absorbing this risk. The save-a-watt program directly addresses this concern by requiring verification of the savings and providing greater emphasis on verified results than traditional cost recovery oriented energy efficiency programs.

Q. CAN RATE IMPACTS BE AN IMPORTANT CONSIDERATION IN EVALUATING ENERGY EFFICIENCY PROGRAMS GENERALLY?

A. Yes. Cost-effective energy efficiency is attractive because it avoids the costs of more expensive supply-side options. However, as energy efficiency lowers the electricity demand of program participants, the utility's fixed costs (*e.g.*, capital recovery of legacy investment) are borne by lower amounts of electricity sales, and hence, average rates and bills of non-participants could unintentionally increase under some specific circumstances. The circumstances under which non-participants face higher bills from energy efficiency, cost savings (i.*e.*, costs avoided) from energy efficiency must be low compared to implementation costs and the amount of utility system fixed costs must be high. Generally, energy efficiency programs with a high ratio of benefits to costs (*i.e.*, energy efficiency programs that on net are very attractive) tend to *lower* even non-participant average rates, and vice versa. Put another way, energy efficiency programs that are mildly net beneficial, but greatly lower sales are less attractive to the extent regulators are concerned about potential rate impacts on non-participants. This non-participant rate effect may result in decision makers choosing only the most attractive energy efficiency and/or overall pursuing energy efficiency less. Thus, lower energy efficiency in some states may reflect this type of concern. Similarly, states with low fixed costs may prefer energy efficiency more. The discrepancy between economic efficiency and rate impacts arises from the fact that fixed costs are "sunk", and hence, energy efficiency decisions can under some circumstances minimize going forward costs, but can raise rates.

Q. WHAT ARE THE IMPLICATIONS OF POTENTIALLY HIGHER BILLS FOR NON-PARTICIPANTS?

A. When examining the problem from the perspective of minimizing total costs regardless of the individual customer effects, this differential in customer impacts is not considered. Thus, it could be the case that there is no impact. However, if it is important to consider the risks of distributional or equity effects, differential impacts may discourage customer energy efficiency. The type of equity argument sometimes made is why should customers spending their own time and effort to maximize electricity usage efficiency subsidize energy efficiency improvements for other customers, especially in those circumstances when the effect is to raise their rates and their bills. The counter argument is that customer costs differences are not uncommon, and that the premise of acting to minimize overall utility costs and charge average rates is still appropriate. In light of this risk, regulators need at least to be made aware that innovation and greater emphasis on energy efficiency might increase the risk of unintentional increases in non-participant rates even though energy efficiency usually has benefited all ratepayers by avoiding even more costly supply-side options usually

Q. WHAT ARE THE ECONOMICS OF CUSTOMER ENERGY EFFICIENCY FROM THE PERSPECTIVE OF THE UTILITY?

A. There are three views expressed in the literature about utility economic incentives vis a vis energy efficiency. First, there is a widely-discussed set of theoretical concerns that utilities are disincentivized to pursue energy efficiency relative to supply-side options because:

- Utilities can have medium and long term incentives for electricity sales growth; higher sales given a fixed rate can increase earnings in the absence of annual rate cases or other mechanisms such as formula rates or decoupling, and higher sales can create opportunities for capital investments that generate earnings.
- Supply-side investments earn a rate of return for investor owned utilities. Typically, energy efficiency investments do not earn a rate of return and/or are less capital intensive and therefore less financially attractive for investors.
- Utilities are sensitive to rate impacts. As noted, rates can increase, with particular impact on non-participants, as fixed cost recovery per unit of sales rises.

- Energy efficiency expenditures affect cash flow if not recovered in timely fashion, and utilities may be reluctant to expose themselves to large recovery risks.
- Sales reductions without higher rates can lead to under recovery of fixed costs.

Second, in contrast to the above concerns, utilities are subject to oversight by their Commissions and are working to lower cost of service. Thus, they have at least informal incentives to perform energy efficiency. Third, there is the view that in many cases utilities are indifferent in that they have neither incentives or disincentives. Definitive empirical evidence is lacking on these three views. However, there is the combination in all states very traditional approaches to energy efficiency and a large gap between estimated potential and achieved savings.

Q. IS THERE ANOTHER ASPECT OF UTILITY ECONOMICS THAT YOU HAVE CONSIDERED?

A. Yes. This is the issue of utility costs for providing energy efficiency services. They may have comparative advantages in the delivery of efficiency services compared to other companies because they have existing relationships with their customers that create economies of scale, especially with smaller customers. They also know their service territory, know their avoided costs, know their resource needs and the timing of those needs, are knowledgeable about electric usage, have relationships with third party vendors, are coordinating with regulators, have existing infrastructure, have lower cost of capital *etc*. These advantages could create opportunities for better returns depending on Commission policy.

IV. THE ECONOMICS OF SAVE-A-WATT

Q. WHAT ARE THE FEATURES OF THE PROPOSED SAVE-A-WATT REGULATORY MODEL THAT ARE IMPORTANT FOR YOUR ANALYSIS OF THE ECONOMICS OF THIS PARTICULAR ENERGY EFFICIENCY APPROACH?

A. Under the proposed save-a-watt proposal there are several economic features that need to be highlighted. They include:

- The Company receives revenues equal to 90% of the utility's estimated avoided costs due to energy efficiency demand and energy reductions.
- The Company undertakes the risks of cost overruns and under achievement of expected savings as determined by an energy efficiency savings verification process.
- The Company proposes and implements specific customer funded energy efficiency programs approved by the South Carolina Commission. Thus, the program involves some features of traditional energy efficiency regulatory review as well as formal incentive mechanisms.
- Through the 90% mechanism, the Company is provided an opportunity (but not a guarantee) to recover its incurred costs and achieve significant earnings on its energy efficiency investments heretofore only available from supply-side resources.

- The Company receives initial funds via an energy efficiency rider, which is provided contingent on verification (and reconciliation to verified impacts) of the electricity demand savings using an independent third party and industry-accepted practices.

Q. CAN YOU ELABORATE ON THE RISK ASPECTS OF SAVE-A-WATT?

A. Note that under the Company's proposal, while the utility is not assuming the risk of covering power costs necessitated by lower than expected energy efficiency demand reductions, the utility is assuming the risk of program costs being higher than expected overall, as well as the risk that program costs will be higher than expected on a per MW or MWh saved level. Save-a-watt reduces uncertainty for its customers because it places that burden of risk that energy efficiency is not as effective as expected on the Company.

Q. HAVE YOU CONDUCTED A DETAILED ASSESSMENT OF THE SPECIFIC INDIVIDUAL ENERGY EFFICIENCY PROGRAMS PROPOSED BY THE COMPANY?

A. No, I have not been asked to do that. Rather, I have focused on the economic principles involved in recognition of the significant uncertainty regarding energy efficiency potential, the lack of experience with save-a-watt, the difficulty in translating generic experience to South Carolina, or any specific setting.

Q. DOES THAT MEAN ANY ESTIMATES OF COSTS AND BENEFITS SHOWN ARE ILLUSTRATIVE?

A. Yes. For example, the $/MWh estimates discussed below are illustrative.

Q. CAN YOU GIVE A SIMPLIFIED EXAMPLE OF HOW THE COMPANY'S ENERGY EFFICIENCY PLAN WOULD WORK?

A. Yes. Consider the case in which estimated utility avoided costs are $50/MWh, and costs to the utility of the energy efficiency program are $30/MWh to $40/MWh (*e.g.*, the costs of administration, incentives, *etc.*), then the Company would receive $45/MWh (0.9 x $50/MWh), and incur $30/MWh to $40/MWh of costs for a net pre-tax profit of $5/MWh to $15/MWh ($45/MWh - $30/MWh or $45/MWh - $40/MWh). Assuming all customers participate equally in the program, customers save $5/MWh. The sum of utility and customer net incremental benefits is $10/MWh to $20/MWh.

Q. WHAT IS THE RESULT OF SAVE-A-WATT FROM AN ECONOMIC EFFICIENCY PERSPECTIVE?

A. The Company's Energy Efficiency Plan is economically efficient because the utility action is lowering overall costs of providing service. In the above example, rather than experiencing a cost of $50/MWh (the utility incremental cost), the cost is $30/MWh to $40/MWh. For example, if avoided costs are $50/MWh and incremental costs are $30/MWh to $40/MWh, then customers and the utility are better off by $10/MWh to $20/MWh. The utility is incentivized to come close to the cost minimizing outcome. The only two exceptions are cases in which energy efficiency costs are between 90% and 100% of avoided costs or when actual avoided societal costs exceed utility avoided costs. In the event that avoided costs were higher (*e.g.*, the avoided costs including externalities is $60/MWh versus $50/MWh as calculated without externalities), the energy efficiency was even more in society's interest when made, and net benefits are \$60/MWh - \$30/MWh to \$40/MWh, or \$20/MWh to \$30/MWh, instead of \$10/MWh to \$20/MWh. However, even more energy efficiency could be economic.

Q. CAN YOU GIVE ANOTHER EXAMPLE OF HOW THE ENERGY EFFICIENCY PLAN WOULD WORK FACTORING IN UNCERTAINTY AND RISKS THAT THE COMPANY HAS TAKEN ON UNDER SAVE-A-WATT?

A. Yes. In the above example, if the estimates of the costs of the Energy Efficiency Program are too low and they turn out to be \$50/MWh, instead of \$20/MWh to \$30/MWh, the Company loses \$5/MWh. Customers still only pay \$45/MWh. The unexpected increase in energy efficiency program costs could occur in two ways. First, the costs of implementing the program could unexpectedly rise. Second, the effective costs could rise if the verified savings are less than expected. For example, if for every MW expected to be saved, it is determined that verified savings are in fact 0.6 MW since 0.4 MW was determined to be free ridership or other problems, the costs would equal \$50/MWh saved (\$30/MWh/0.6). Of course the net benefit can go the other way – *e.g.,* costs are lower and uncertainty is greater.

Q. IN THIS SECOND EXAMPLE, WHAT IS THE RESULT FROM AN ECONOMIC EFFICIENCY PERSPECTIVE?

A. When the decision was made to pursue the energy efficiency program, it was expected to be economic. After the fact, it was still an economic break-even activity, *i.e.,* marginal benefits were the \$50/MWh and costs were \$50/MWh – net benefit was zero. However, the Company loses $5/MWh. If the cost turns out to be $55/MWh, society is worse off and the Company loses even more money. As long as the Company stops the program as soon as it realizes it is losing money, it still was an economic activity on an expected value basis and should be pursued from a risk neutral basis.

Q. IS THE POTENTIAL COMPANY LOSS A SIGNIFICANT ECONOMIC FACTOR?

A. Yes. First, the program decreases the risks to customers of ineffective energy efficiency or cost overruns. Second, while utilities usually have the potential for disallowances for energy efficiency expenditures after implementation, no major disallowances have been approved in the U.S. that ICF is aware of; minor disallowances have occurred. In light of the nature of the save-a-watt approach, energy efficiency program effectiveness is likely to receive greater scrutiny.

Q. FROM AN INCENTIVE PERSPECTIVE, WHAT ARE THE EFFECTS OF SAVE-A-WATT?

A. The Company's Energy save-a-watt model provides close to the maximum incentive to the utility to pursue energy efficiency without creating incentives for over-use of energy efficiency – *i.e.,* pursuit of programs that have greater incremental costs than incremental benefits. Put another way, this strongly aligns utility interests with those most interested in maximizing energy efficiency.

There are only three ways to increase utility incentives relative to save-a-watt while still meeting efficiency tests: (1) increase the payment to 100% of avoided cost, (2) include in avoided costs environmental costs like CO_2 not included in the proposed calculation of avoided costs, and/or (3) eliminate the after the fact review of program cost effectiveness. With regard to point (1), I would add that, from a theoretical economic perspective, as long as the estimated save-a-watt costs are $1 less than the estimated avoided supply-side costs, it is economic.

Q. WHAT HAPPENS TO CUSTOMERS UNDER SAVE-A-WATT COMPARED TO ENERGY EFFICIENCY PROGRAMS WITH LITTLE OR NO INCENTIVES AND RISKS?

A. There are three possible effects. One possible effect would be to raise the costs of energy efficiency to customers because incentives paid to utilities fail to change utility behavior sufficiently when compared to an approach without or with less utility incentives. This would tend to increase average tariff rates especially for non-participants relative to a model/approach with no or lower incentive payments. Following up the first example, $5/MWh to $15/MWh of net benefits accrues to the utility and $5/MWh accrues to the customers. If there were no change in behavior, in this example, customer costs are $5/MWh to $15/MWh higher compared to an energy efficiency program with no incentives.

Q DOES THAT MEAN THAT IF THERE IS NO INCREASE IN ENERGY EFFICIENCY DUE TO SAVE-A-WATT, CUSTOMERS ARE NECESSARILY WORSE OFF?

A. No. The second possible effect would be to insulate customers from ineffective energy efficiency or energy efficiency cost overruns. This would tend to lower rates. In the second example, gross utility costs were $50/MWh, net utility costs were $5/MWh, and customer costs were limited to $45/MWh.

Q. IS IT POSSIBLE THAT CUSTOMER BENEFITS CAN BE GREATER UNDER SAVE-A-WATT THAN COMPARED TO A PROGRAM WITH LESS INCENTIVE PAYMENT TO THE UTILITY?

A. Yes. Consider the following behavioral outcomes:

- In the first example, if the energy efficiency undertaken was greater and or more innovative than under a model/approach with less incentive to the utility, customer benefits could be greater. For example, if the level of energy efficiency activity were zero before save-a-watt, the customer is $5/MWh better off.
- In another example, if customers were previously receiving all the benefits but under save-a-watt, the amount of energy efficiency increased by a factor of more than two to four, then the customer would be better off than in a model/approach that gave all the benefit to the customers[3]. Since studies indicate the achievable energy efficiency savings in MWh could be 12 times the average U.S. level achieved, this effect could be very important.
- The fact that societal benefits -- such as lower CO_2 emissions – are over and above the quantified benefits of energy efficiency under save-a-watt.

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[3] EE was providing $5/MWh to customers under save-a-watt versus $10/MWh to $20/MWh under incentive payments. Doubling activity gets $10 of benefit and compensates in one of the cases for the lower customer benefit rate.

- If cost overruns occur, the customers are protected and this also decreases the required increase in activity.

Q. DO YOU EXPECT SAVE-A-WATT TO CHANGE UTILITY BEHAVIOR AND INCREASE ENERGY EFFICIENCY COMPARED TO ALTERNATIVE APPROACHES WITH LITTLE OR NO INCENTIVES?

A. Yes, in many cases I believe this would occur. I have several additional comments on this issue:

- My conclusion is based on my experience in power economics, which causes me to have significant respect for the effect of incentives on behavior. This view would lead one to expect that the Company's Energy Efficiency Plan would lead to more energy efficiency, more utility interest in and support for energy efficiency, more innovation in energy efficiency, and greater attention to cost and cost effectiveness. This view is supported by the discrepancy between the energy efficiency achieved to date and the full potential of energy efficiency which indicates the need for changes in energy efficiency. This is also based on the relatively large supply-side compared to demand side activity nation wide in spite of more than 20 years of efforts to integrate resource planning to place energy efficiency on a level playing field with supply options. This discrepancy is consistent with the theory that utility incentives to make supply-side investments influence outcomes of the regulated process. I also base this conclusion on the fact that while save-a-watt is different than other energy efficiency programs, the majority of states with significant energy efficiency programs employ formal incentive mechanisms. For example, even the largest energy efficiency state in terms of energy efficiency expenditures, California, has recently adopted a formal incentive system. The save-a-watt model also properly focuses on the value created for customers rather than the costs incurred by the utility – with that value tied to the costs of alternative resources. From an economic efficiency perspective, this focus on value created, rather than costs incurred, sends the utility an appropriate signal with respect to operational efficiency. It rewards the utility for results rather than efforts, and in my view will serve to encourage and reward both innovation and exemplary performance. Lastly, the complexity of energy efficiency may make it harder to regulate using traditional cost-oriented means than supply-side options, *e.g.*, the multiplicity of end-uses, the variety among end-users sub-groups, equipment types, program types, *etc.*

- The reason I answered "in many cases" as opposed to "unambiguously yes" is in part because as a regulatory economist, I also recognize that administrative and regulatory systems can create powerful incentives separately and in addition to formal explicit incentive payments. Thus, it is possible that in some circumstances significant and sustained increases in regulation, or other major program changes, could have similar effects to formal utility incentives systems. However, the history of fits and starts with energy efficiency, and the existence of apparently significant untapped potential should cause many jurisdictions to realistically assess this potential, and not put too much reliance on it. Put another way, there is no single theoretical answer for all circumstances with respect to the proper mix of regulation/administrative action and explicit formal incentive programs in light of the complexity of comparing traditional regulations and incentives. There is also no single unambiguous answer due to the lack of sufficient controlled experiments on energy efficiency and the Company's proposal – *e.g.,* save-a-watt versus other models. Lastly, it may be the case that the estimates of the potential for energy efficiency are overstated. In this case, the risks of higher utility returns are not offset by the potential benefits of greater energy efficiency savings. The size of gap between the estimated national potential and the maximum achieved to date, 8% versus 24% is large and either the models/approaches need to be changed or the estimates as too what is achievable need to be changed.

V. OVERVIEW OF U.S. ENERGY EFFICIENCY PROGRAMS

Q. WHAT ARE THE ISSUES ADDRESSED IN THIS SECTION?

A. I address: (1) the level of energy efficiency and variation, (2) incentive programs in the US, and (3) specific notable incentive programs.

Level Of Energy Efficiency

Q. CAN YOU PROVIDE A BRIEF NATIONAL OVERVIEW OF THE LEVEL OF ACTIVITY IN ELECTRIC UTILITY CUSTOMER ENERGY EFFICIENCY PROGRAMS?

A. Yes. I would like to highlight the following national features from public data sources. There is some uncertainty regarding this data, due to a variety of issues (*e.g.,* self reporting by utilities to the federal government, and varying standards for verification). There are, in particular, concerns about the cost per MWh saved data. Also, I have not performed independent verification of these figures. Nonetheless, this is still a useful overview of recent trends and, they are overall somewhat consistent with ICF experience.

- 48 states report utility energy efficiency expenditures for 2004[4]
- States reported utility expenditures $50,000 and above
- Total expenditures were $1.45 billion
- Since 1993, the annual average growth rate of utility expenditures between 1993 and 2004 is minus 4% in real terms.
- In 2004, cumulative savings were approximately 74 million MWh or 2.1% of total US electrical energy demand in 2004[5].
- Expenditures were on average 0.54% of total revenues nationwide

Q. WHAT ARE REPORTED AVERAGE COSTS?

A. Average energy efficiency costs were estimated to be $19/MWh. However, there is uncertainty about this average cost estimate.

Q. WHAT IS YOUR REACTION TO THE REPORTED LEVELS OF CUSTOMER ENERGY EFFICIENCY?

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[4] Source: A Nationwide Assessment of Utility Sector Energy Efficiency Spending, Savings and Integration with Utility System Resource Acquisition, York and Kushler, ACEEE, 2006.

[5] NERC reports that in 2006, the sum of U.S. interruptible demand and direct control load management was 18.5 GW or 2.3% of U.S. summer peak demand.

A. The level of estimated energy efficiency saving seems small. I base this on several considerations. First, the savings is small when compared to U.S. electricity demand growth. Average U.S. electricity demand growth per year is approximately 2.5% and exceeds annual cumulative U.S. savings from energy efficiency of 2.1% (see Table 2). Second, this level is also low in light of rising U.S. average electricity rates which increase the incentives for energy efficiency especially since the same factors raising rates are also increasing marginal utility costs – *i.e.*, utility avoided costs. Third, the low reported average costs per MWh of energy efficiency savings indicate that this resource is not fully utilized. Fourth, ICF and other studies[6] support the conclusion that utilization of energy efficiency resources can be economically increased by a large amount. Fifth, the differences across states imply greater potential, though it is difficult to compare due to differences in end use, rates, avoided costs, *etc.* Sixth, 99.5% of utility costs are not associated with customer energy efficiency; energy efficiency only accounts on a national average for 0.5% of utility revenues.

Q. WHAT COULD BE THE CAUSE OF THE LACK OF ENERGY EFFICIENCY ACTIVITY?

A. There could be many causes of the lack including: (1) reluctance to risk higher rates for non-participants, (2) a lag from periods of lower avoided costs, (3)

[6] The Technical, Economic and Achievable Potential for Energy-Efficiency in the U.S. – A Meta-analysis of Recent Studies Steven Nadel, Anna Shipley and R. Neal Elliott, ACEEE, 2004. National Action Plan for Energy Efficiency, July 2006. Both studies cite the Interlaboratory Working Group (2000) study – Scenarios for a Clean Energy Future – that shows 24% of achievable energy savings over 20 years for the U.S.. This study was carried out by Oak Ridge National Laboratory, Tennessee, Lawrence Berkeley National Laboratory, Berkeley, CA and National Renewable Energy Laboratory, Golden, CO.

difficulty in sustaining the regulatory and administrative apparatus for energy efficiency, (4) reliance on other mechanisms to encourage efficiency such as mandatory standards, and (5) lack of formal incentives. It does appear that a "business as usual" approach to energy efficiency is not working if the goal is to rely more heavily on energy efficiency.

Q. WHATEVER THE CAUSE, WHAT ARE THE IMPLICATIONS?

A. This lack of existing energy efficiency argues that changes are required to increase energy efficiency activity.

Table 2
U.S. Retail Electricity Rates and Demand

Year	US Average Retail Price - All Sectors (cents/kWh)		U.S. Summer Peak Demand
	Nominal$	2006$	MW
1993	6.93	9.10	575,356
1994	6.91	8.88	585,320
1995	6.89	8.68	620,249
1996	6.86	8.48	616,790
1997	6.85	8.33	637,677
1998	6.74	8.11	660,293
1999	6.64	7.87	682,122
2000	6.81	7.90	678,413
2001	7.29	8.26	687,812
2002	7.20	8.02	714,565
2003	7.44	8.11	709,375
2004	7.61	8.07	704,459
2005	8.14	8.38	758,876
2006	8.85	8.85	789,475
Annual Average Growth Rates			
(1993-2006)	1.9%	-0.2%	2.5%
(1997-2006)	2.6%	0.4%	2.5%
(2000-2006)	4.5%	1.9%	2.6%
(2004-2006)	7.8%	4.7%	5.9%

Sources:
(1) Retail Prices: http://www.eia.doe.gov/cneaf/electricity/epm/epm_sum.html
(2) Demand: NERC ES&D

Q. IS THERE SIGNIFICANT VARIATION IN ENERGY EFFICIENCY SAVINGS AND ACTIVITY WITHIN THE COUNTRY?

A. Yes. The top six states in terms of total dollars expended accounted for 64% of the total estimated US expenditures, and 58% of the estimated demand reductions. (See Table 3) These states report savings on average of 4.7% of demand versus the U.S. average of 2.1% or 2.2 times higher. Of these six states, the largest savings percentage is 8% in California. These levels of savings are still well below the estimated potential of 24% and emphasize that no state has solved the problem of maximizing the estimated potential.

Q. COULD THESE STATES BE A MODEL FOR OTHER STATES IN TERMS OF ENERGY EFFICIENCY?

A. Since these six states so dominate energy efficiency activity, their treatment of energy efficiency could be informative. However, their rates and avoided costs are among the highest in the U.S. except for the state of Washington. The average of these states is 65% above the South Carolina average. Washington also has an unusual demand situation with electricity meeting much more of the space heating needs than the national average. Hence, Washington's energy efficiency may reflect their greater than average economic potential for energy efficiency rather than programmatic advantages. These states generally may also have different risk attitudes, different views on non-participant rate impacts, and less fixed costs.

Table 3
2004 State Spending, Savings and Retail Sales

State	2004 Energy Efficiency Spending $1,000	% of Total US Energy Efficiency Spending	2004 Energy Efficiency Savings GWh (Cumulative)	% of total US Energy Efficiency Savings	2004 Total Retail Sales (GWh)	Cumulative Savings as % of Total Retail Sales	2006 Retail Rate (Nominal$/MWh)
California	380,009	26%	19,590	26%	252,026	8	127
New York	147,193	10%	4,772	6%	145,082	3	137
Massachusetts	133,326	9%	3,514	5%	56,142	6	155
New Jersey	92,753	6%	3,234	4%	77,593	4	115
Washington	88,522	6%	5,974	8%	79,982	7	60
Texas	80,000	6%	6,229	8%	320,615	2	103
Total/Average	921,803	64%	43,313	58%	931,439	5	116

Sources:
1 A Nationwide Assessment of Utility Sector energy Efficiency Spending, Savings and Integration with Utility System Resource Acquisition, York and Kushler, ACEE, 2006.
2 EIA.

Q. IS THERE ANOTHER MEASURE OF THE LEVEL OF ENERGY EFFICIENCY ACTIVITY?

A. Yes, per capita expenditures are another measure. (See Table 4) This data shows some smaller states also relatively active in energy efficiency such as Vermont, Rhode Island, and New Hampshire. These sixteen states have a weighted average savings level of 5.5%.

Table 4
2003 Ranking by Spending per Capita

State	Energy Efficiency Spending in $ Per Capita
Vermont	28.26
Massachusetts	21.49
New Hampshire	16.45
Washington	15.21
Rhode Island	14.13
Oregon	13.44
Wisconsin	11.33
New Jersey	11.31
Montana	10.65
Iowa	10.17
Connecticut	10.10
California	9.34
Hawaii	8.72
Minnesota	8.65
Maine	8.03
New York	7.46
Source: ACEEE's 3rd National Scorecard on Utility and Public Benefits Energy Efficiency Programs: A National Review and Update of State-Level Activity, October 2005.	

Incentive Program Overview

Q. WHAT ARE THE TYPES OF ELECTRIC UTILITY CUSTOMER ENERGY EFFICIENCY PROGRAMS, ESPECIALLY THOSE IN CURRENT USE ACROSS THE COUNTRY?

A. There are a wide variety of programs covering a wide variety of end uses of electricity and program structures. However, I will focus in on the issue of utility funding and utility incentive mechanisms. In this regard, there is still significant diversity. To start, I want to describe two broad categories of energy efficiency models: (1) approaches providing cost recovery only, and (2) approaches providing incentives to the utility plus cost recovery.

Q. PLEASE DESCRIBE ENERGY EFFICIENCY MODELS/APPROACHES PROVIDING PROGRAM COST RECOVERY ONLY?

A. Of the approximately 25 states that have significant[7] utility customer-funded energy efficiency programs, all provide cost recovery but 32% provide no formal utility incentives. Put another way, most states do not stop with cost recovery but go beyond this. In most cases, costs are recovered through rate filings. In others, costs are recovered through tariff riders or via the System Benefits Charge ("SBC"). Thus, the majority of states have incentives and the number of states with incentives is increasing. For example, even California, a state with a history of large expenditures on energy efficiency has recently changed direction and adopted formal utility incentives for DSM.

Q. PLEASE DESCRIBE PERFORMANCE INCENTIVE PROGRAMS?

A. As noted, formal utility incentives are very common. 17 states of the 25 states or 68% of the states with significant energy efficiency employ utility incentives of some kind.[8] Specifically:

- **Shared Savings** – Nine of the seventeen states with incentives have shared savings mechanisms[9]. The Company's proposal generally falls into

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[7] "Significant" is defined as programs that truly attempt to achieve measurable savings, including using strategies like providing tangible incentives to customers to improve their energy efficiency. Approaches such as providing "conservation tips" mailers or on websites do not qualify as a significant energy efficiency program. Source: Aligning Utility Interests with Energy Efficiency Objectives: A Review of Recent Efforts at Decoupling and Performance Incentives, Kushler, York and Witte, ACEEE. October 2006.

[8] Source: National Action Plan for Energy Efficiency (2007). Aligning Incentives with Investment in Energy Efficiency. Prepared by Val R. Jensen, ICF International. www.epa.gov/eeactionplan. Aligning Utility Incentives with Investment in Energy Efficiency is a product of the National Action Plan for Energy Efficiency Leadership Group and does not reflect the views, policies, or otherwise of the federal government. The role of the U.S. Department of Energy and U.S. Environmental Protection Agency is limited to facilitation of the Action Plan.

this shared savings category. For example, in Minnesota, utilities are rewarded with a specific percentage of net benefits (as measured by the utility cost-effectiveness test) created by their actual investments in energy conservation. The percentage of net benefits awarded increases as the percentage of energy-savings goal achieved increases. The incentive is calibrated such that at 150% of the energy savings goal, the utility would receive about 30% of the utility's conservation expenditure budget as required by statute. Under the incentive design, utilities are also rewarded for delivering their programs more cost-effectively because more net benefits are created when actual costs are lowered. Customers fund the incentive during the following year when the Commission adjusts rates. Recently these charges have been on the order of 1.45%.[10] Currently, spending is above statutory requirements. More generally, utilities have been reporting informally that their management is more supportive of energy efficiency investments because: (1) recovery of conservation investment is guaranteed including a carrying charge on these investments, as well as an annual automatic adjustment to recover these investments, and (2) the performance incentive makes additional investments more

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[9] Source: Ibid. Additionally, ICF research identified two more states that have shared savings mechanisms.

[10] Source: Aligning Utility Interests with Energy Efficiency Objectives: Decoupling and Performance Incentives, ACEEE, Kushler, York and Witte, October 2006, ACEEE.

attractive (beyond simply fulfilling statutory requirements for spending levels).[11]

- **ROR Adder** – Six of the seventeen states with incentives have rate of return incentives. In Nevada, for example, utilities are allowed to earn as much as an extra 5% return on equity ("ROE") for applicable, approved energy efficiency costs (base ROE is 10.25% - implying that utilities could earn up to 15.25% ROE)[12].
- **Performance Target** – Three of the seventeen states have performance target incentives. In Connecticut, performance incentives for 2008 ranged between 1% and 8% of the program costs before taxes for achieving or exceeding established goals. The minimum threshold is 70% of goals and would earn the 2% incentive. For reaching 100% of goals the incentive would be 5%, and for reaching 130% of goals, it would be 8%. Program costs are recovered through rates[13].

Q. ARE THERE OTHER ENERGY EFFICIENCY PROGRAMS WORTH MENTIONING?

A. Yes. These include:

- **Lost Revenue Adjustment Mechanism** – Utility receives lost margin which is fixed minus variable costs.

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[11] Source: State EE/RE Technical Forum: Call #8 Decoupling Energy Sales from Revenues and Other Approaches to Encourage Utility Investment in Efficiency, the Minnesota Approach by Commissioner, Minnesota, PUC.

[12] Source: Aligning Utility Interests with Energy Efficiency Objectives: Decoupling and Performance Incentives, ACEEE, Kushler, York and Witte, October 2006, ACEEE.

[13] Ibid.

- **Decoupling** – Utility revenues are trued up to actual sales net of energy efficiency. Some efforts have been made in this regard, but in the several cases in which it has been tried it has not been done long enough to evaluate.[14]
- **Non-Utility Program Administrator** – The states pursuing this include Vermont, New Jersey, New York in some degree, and Ohio.

<u>**Specific Notable Incentive Programs**</u>

Q. IN DISCUSSING THE TYPES AND PREVALENCE OF ENERGY EFFICIENCY MODELS/APPROACHES, YOU MENTIONED THE FREQUENCY OF THE MODELS/APPROACHES BY STATE. IS THERE ANOTHER WAY TO DESCRIBE THE APPROACHES?

A. Yes. The top six states efficiency models/approaches also show significant programmatic diversity relating to the use of incentives. These six states are California, New York, Massachusetts, New Jersey, Texas and Washington. Of these, California, Texas, New York and Massachusetts have or are adopting explicit incentive systems. New Jersey is also conducting a fundamental review of energy efficiency, though the outcome vis~a~vis incentives is unclear.

Key developments in these six states include:

- **California** – California spends more than any other state on energy efficiency by a wide margin, and has the largest savings of the six major states (8%). It has recently adopted a program providing potentially large formal energy efficiency incentives for IOUs. There are many differences

[14] Ibid.

between California and South Carolina (*e.g.,* much higher rates and avoided costs, more current energy efficiency, *etc.*) However, a review in some detail is in order.

California's Public Goods Charge ("PGC") was initiated in 1996 as part of AB 1890, the state's restructuring act. While restructuring has been suspended, the PGC continues to be used to fund efficiency, renewable energy, and other projects. In 2002, the California Legislature approved AB 57, which mandated a return to an IRP process after a hiatus during restructuring. In January 2004, the California Public Utilities Commission adopted the regulatory framework for the Long-Term Procurement Planning (LTPP) process which required utilities to include energy efficiency in their generation and transmission resource planning. For the 2006-2008 program cycle, the CPUC has set up a goal of 6,812 GWh of electricity additional energy efficiency savings and a three-year budget of $1.975 billion or $658 million per year for the three IOUs – Pacific Gas & Electric, San Diego Gas & Electric and Southern California Edison[15].

In September 2007, the CPUC adopted a risk-reward performance incentive mechanism whereby earnings begin to accrue at a 9% sharing rate if the utility meets 85% of the Commission's savings goals. If portfolio performance achieves 100% of the goals, the earnings rate increases from 9% to 12%. (See Table 5) Each earnings rate is a "shared-savings" percentage. This means, for example, if the combined utilities

[15] Source: CPUC

achieve 100% of the 2006-2008 savings goals and the verified net benefits (resource savings minus total portfolio costs) at that level of performance is $2.7 billion, then $2.4 billion (88%) of those net benefits goes to customers and $323 million (12%) goes to utility shareholders.[16] At its maximum, utilities could earn $52.8/MWh.[17]

Table 5
California Incentive Program

Parameter	2006-08
Total Electricity Savings (GWh)[1]	6,812
Shared Savings (MM$)[2]	
Scenario 1 (at 85% of goal)	176
Scenario 2 (at 100% of goal)	323
Scenario 3 (at 125% of goal)	450
Shared Savings as a portion of 206-2008 total goal ($/MWh)	
Scenario 1 (at 85% of goal)	30.4
Scenario 2 (at 100% of goal)	47.4
Scenario 3 (at 125% of goal)	52.8

[1] Source: INTERIM OPINION: ENERGY SAVINGS GOALS FOR PROGRAM YEAR 2006 AND BEYOND, CPUC, 9/23/2004
[2] Source: INTERIM OPINION ON PHASE 1 ISSUES: SHAREHOLDER RISK/REWARD INCENTIVE MECHANISM FOR ENERGY EFFICIENCY PROGRAMS, CPUC, 9/25/2007
[2] Total Electricity Savings shown above are assumed to be 100% of goal

If utility portfolio performance falls to 65% of the savings goals or lower, then financial penalties begin to accrue. There are two penalty provisions, and the greater of the two applies when savings fall to (or below) the 65% threshold. The "per unit" penalties are 5¢ per kilowatt-hour (kWh) and $25 per kilowatt (kW) for each unit below the savings goal. The "cost-effectiveness guarantee" obligates shareholders to pay customers back dollar-for-dollar for negative net benefits.

[16] Source: CPUC Decision, September 20, 2007.

[17] $450 million/(6,812 GWh x 1.25)

Applying these penalty provisions to the current 2006-2008 utility portfolios results in estimated penalties on the order of $144 million for all utilities combined, if performance falls to 65% of the goals. Estimated penalties increase to $238.5 million when performance falls to 50% of the goals. Below 50% of goals, penalties associated with the cost-effectiveness guarantee are expected to become larger than the per-unit penalties. At that point, customers will receive dollar-for-dollar reimbursement for negative net benefits under the cost-effectiveness guarantee[18].

- **New York** – New York State Energy Research and Development Agency (NYSERDA) leads the NY's System Benefits Charge ("SBC") funded program which constitutes the state's largest funding of energy efficiency programs. The current annual budget is $188 MM. In December 2005, NYPSC extended the SBC-funded program for another five years (July 2006 – June 2011) with annual funding of $175 MM. On the utility side, Con Edison has also conducted programs geared at energy reduction. In 2006, it spent nearly $5 million on these programs ($3.6 million for electric programs and $1.4 million on a gas efficiency pilot program). Other New York utilities are in the beginning stages of developing energy

[18] Source: CPUC Decision, September 20, 2007.

efficiency programs. Performance incentive mechanisms are currently being discussed[19].

- **Massachusetts** – Massachusetts' 1997 restructuring act (the 1997 Act) replaced the state's regulatory wires charge with a statutory wires charge to fund energy efficiency programs. The initial program was authorized through 2003. A 2002 Act extended the program through 2008. Chapter 140 of the Acts of 2005 further extended the program through 2012. The energy efficiency and low-income programs are funded by a monthly charge (system benefits charge) on customer's bills ($2.5/MWh)[20]. The distribution utilities collect the funds. The collected funds go into a trust fund. Each utility estimates how much money it will collect each year. This determines how much they have to spend on energy efficiency programs that year. If the utility over- or under-estimates the budget, the difference is made up the following year. Based on the budget, each company submits an annual energy efficiency program proposal. Division of Energy Resources and Dept. of Telecommunications and Energy ("DTE") approves and oversees the plan and utility companies manage and implement the actual programs.

  Performance incentives are based on reaching certain performance target levels and payments are based on a short-term, risk-free interest rate, as

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[19] Source: New York Department of Public Service Staff Preliminary Proposal for EE Program Design and Delivery, August 28, 2007.

[20] Source: Aligning Utility Interests with Energy Efficiency Objectives: Decoupling and Performance Incentives, ACEEE, Kushler, York and Witte, October 2006, ACEEE

estimated by the average three-month T-bill yield during the most recent twelve months. If a utility reaches the 75% threshold level shall be entitled to an incentive payment equal to 75% of the three-month T-bill rate and likewise, a company that achieves the exemplary level shall be entitled to an incentive payment of 125% of the average three-month T-bill rate, with scaled incentives in between. In this way, shareholder incentives are capped at the exemplary level, using 125% of the average three-month T-bill rate[21].

- **Texas** – The rules are currently being revised in Texas. The Public Utilities Commission of Texas staff is proposing a shared savings program. Under this model/approach, a utility that exceeds 100% of its demand reduction goal ("DRG") shall receive a bonus equal to 1% of the net benefits for every 2% that the demand reduction goal has been exceeded, with a maximum of a 20% of net benefits bonus. Net benefits shall be calculated as the sum of total avoided cost associated with the eligible programs administered by the utility minus the sum of all program costs. The initial avoided cost of capacity is $80/kW per year. The avoided cost of capacity shall be adjusted every two years based on the annual capacity costs of a new simple-cycle gas turbine, using a recognized industry source of information, adjusted for line losses. The initial avoided cost of energy is $0.055 cents/kWh[22].

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[21] Source: Massachusetts' Department of Telecommunications and Energy Order DTE 98-100.

[22] Source: PUC of Texas Staff Proposal to amend Energy Efficiency Rules.

- **New Jersey** – On February 9, 1999, the Electric Discount and Energy Competition Act established requirements to advance energy efficiency and renewable energy in New Jersey through the societal benefits charge ("SBC"). Under this Act, the 2005-2008 funding levels and goals have been described. For example, the 2007 budget for energy efficiency programs is $123MM and the 2007 energy efficiency annual savings goal is 487 GWh[23]. In September 2005, the New Jersey Department of Treasury, on behalf of NJBPU, issued a request for proposal to solicit bids from potential market managers to administer New Jersey's energy efficiency and renewable programs. In September 2006, one market manager was selected to administer residential energy efficiency and renewable energy programs and another market manager for commercial and industrial energy efficiency programs[24].
- **Washington** – In Washington, energy efficiency assessments need to be part of utility's Integrated Resource Plan filing. Utilities have funded their energy conservation programs through either a system benefits charge (*e.g.*, Pacific Power) or conservation riders (*e.g.*, Avista and Puget Sound Energy). Since 1995, Avista's conservation programs have been funded through a surcharge in rates called a tariff rider. The tariff rider currently collects around $4 million in electric rates in Washington annually. Avista has a target to conserve at least 40 million kilowatt-hours each year in

[23] Source: New Jersey BPU Order, Docket No. EO07030203.

[24] Source: New Jersey BPU Order, Docket No. EO05080667.

their multi-state service area. In 2000, Pacific Power put in place a SBC to fund their conservation programs in Washington. The SBC is a surcharge to rates. The SBC is expected to collect around $4.5 million annually for programs that capture about 19 million kWh in electricity savings. Since 1997, PSE has funded their conservation programs through the conservation rider, which is a separate surcharge on customer bills. As a result of their 2002 rate case, PSE committed to capturing 177 million kWh in the 16-month period of September 2002 through December 2003, at an expected cost of $28 million[25]. No performance incentives are currently in place for utilities administering energy efficiency programs in Washington.

Q. WHAT DO YOU CONCLUDE BASED ON THIS REVIEW OF APPROACHES TO INCENTIVES?

A. Save-a-watt is an innovative, comprehensive and streamlined approach to maximizing the energy efficiency potential via utility incentives. It responds directly to the lack of any example of utility energy efficiency achieving savings close to the estimated potential and is attractive because it focuses utility incentives on the value provided, not simply the costs of programs. The approach creates risks for the utility in the event that verifiable savings are not achieved or that costs exceed expectations, but also creates the potential for higher utility returns on the value provided. Experience and empirical data do not permit a definitive conclusion as to what is the best approach to energy efficiency.

[25] Source: Washington Utilities and Transportation Commission.

However, in light of the potential economic advantages of energy efficiency, and to the extent regulators are looking for innovative ways to maximize energy efficiency achieved, I believe they should approve Duke Energy Carolinas' Energy Efficiency Plan, including the save-a-watt regulatory model.

Q. DOES THIS CONCLUDE YOUR PRE-FILED DIRECT TESTIMONY?

A. Yes, it does.

BEFORE
THE PUBLIC SERVICE COMMISSION
OF SOUTH CAROLINA
DOCKET NO. 2007-358-E

In Re: Application of Duke Energy Carolinas, LLC for Approval of Energy Efficiency Plan Including an Energy Efficiency Rider and Portfolio of Energy Efficiency Programs	))))))))	**CERTIFICATE OF SERVICE**

This is to certify that I, Leslie L. Allen, a legal assistant with the law firm of Robinson, McFadden & Moore, P.C., have this day caused to be served upon the person(s) named below the **Testimony of Judah Rose** in the foregoing matter by placing a copy of same in the United States Mail, postage prepaid, in an envelope addressed as follows:

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Dated at Columbia, South Carolina this 10th day of December, 2007.

Leslie Allen

Leslie L. Allen